

SEQUENCE LISTING

<110> THE GOVERNMENT OF THE UNITED STATES OF AMERICA AS
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<120> NOVEL CORONAVIRUS ISOLATED FROM HUMANS

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<151> 2003-04-25

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<212> PRT
<213> Coronavirus

<400> 2

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Asp	Ser	Val	Glu	Glu	Ala	Leu	Ser	Glu	Ala	Arg	Glu	His	Leu	Lys	Asn	35	40	45	
Gly	Thr	Cys	Gly	Leu	Val	Glu	Leu	Glu	Lys	Gly	Val	Leu	Pro	Gln	Leu	50	55	60	
Glu	Gln	Pro	Tyr	Val	Phe	Ile	Lys	Arg	Ser	Asp	Ala	Leu	Ser	Thr	Asn	65	70	75	80
His	Gly	His	Lys	Val	Val	Glu	Leu	Val	Ala	Glu	Met	Asp	Gly	Ile	Gln	85	90	95	
Tyr	Gly	Arg	Ser	Gly	Ile	Thr	Leu	Gly	Val	Leu	Val	Pro	His	Val	Gly	100	105	110	
Glu	Thr	Pro	Ile	Ala	Tyr	Arg	Asn	Val	Leu	Leu	Arg	Lys	Asn	Gly	Asn	115	120	125	
Lys	Gly	Ala	Gly	Gly	His	Ser	Tyr	Gly	Ile	Asp	Leu	Lys	Ser	Tyr	Asp	130	135	140	
Leu	Gly	Asp	Glu	Leu	Gly	Thr	Asp	Pro	Ile	Glu	Asp	Tyr	Glu	Gln	Asn	145	150	155	160
Trp	Asn	Thr	Lys	His	Gly	Ser	Gly	Ala	Leu	Arg	Glu	Leu	Thr	Arg	Glu	165	170	175	
Leu	Asn	Gly	Gly	Ala	Val	Thr	Arg	Tyr	Val	Asp	Asn	Asn	Phe	Cys	Gly	180	185	190	
Pro	Asp	Gly	Tyr	Pro	Leu	Asp	Cys	Ile	Lys	Asp	Phe	Leu	Ala	Arg	Ala	195	200	205	
Gly	Lys	Ser	Met	Cys	Thr	Leu	Ser	Glu	Gln	Leu	Asp	Tyr	Ile	Glu	Ser	210	215	220	

Lys Arg Gly Val Tyr Cys Cys Arg Asp His Glu His Glu Ile Ala Trp
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Phe Thr Glu Arg Ser Asp Lys Ser Tyr Glu His Gln Thr Pro Phe Glu
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Ile Lys Ser Ala Lys Lys Phe Asp Thr Phe Lys Gly Glu Cys Pro Lys
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Phe Val Phe Pro Leu Asn Ser Lys Val Lys Val Ile Gln Pro Arg Val
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Glu Lys Lys Lys Thr Glu Gly Phe Met Gly Arg Ile Arg Ser Val Tyr
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Pro Val Ala Ser Pro Gln Glu Cys Asn Asn Met His Leu Ser Thr Leu
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Met Lys Cys Asn His Cys Asp Glu Val Ser Trp Gln Thr Cys Asp Phe
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Pro Cys Pro Ala Cys Gln Asp Pro Glu Ile Gly Pro Glu His Ser Val
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Ala Asp Tyr His Asn His Ser Asn Ile Glu Thr Arg Leu Arg Lys Gly
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Gly Arg Thr Arg Cys Phe Gly Gly Cys Val Phe Ala Tyr Val Gly Cys
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Tyr Asn Lys Arg Ala Tyr Trp Val Pro Arg Ala Ser Ala Asp Ile Gly
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Asp Leu Leu Glu Ile Leu Ser Arg Glu Arg Val Asn Ile Asn Ile Val

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Gly Asp Phe His Leu Asn Glu Glu Val Ala Ile Ile Leu Ala Ser Phe				
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Ser Ala Ser Thr Ser Ala Phe Ile Asp Thr Ile Lys Ser Leu Asp Tyr				
	485		490	495
Lys Ser Phe Lys Thr Ile Val Glu Ser Cys Gly Asn Tyr Lys Val Thr				
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Lys Gly Lys Pro Val Lys Gly Ala Trp Asn Ile Gly Gln Gln Arg Ser				
	515		520	525
Val Leu Thr Pro Leu Cys Gly Phe Pro Ser Gln Ala Ala Gly Val Ile				
	530		535	540
Arg Ser Ile Phe Ala Arg Thr Leu Asp Ala Ala Asn His Ser Ile Pro				
545		550		555 560
Asp Leu Gln Arg Ala Ala Val Thr Ile Leu Asp Gly Ile Ser Glu Gln				
	565		570	575
Ser Leu Arg Leu Val Asp Ala Met Val Tyr Thr Ser Asp Leu Leu Thr				
	580		585	590
Asn Ser Val Ile Ile Met Ala Tyr Val Thr Gly Gly Leu Val Gln Gln				
	595		600	605
Thr Ser Gln Trp Leu Ser Asn Leu Leu Gly Thr Thr Val Glu Lys Leu				
	610		615	620
Arg Pro Ile Phe Glu Trp Ile Glu Ala Lys Leu Ser Ala Gly Val Glu				
625		630		635 640
Phe Leu Lys Asp Ala Trp Glu Ile Leu Lys Phe Leu Ile Thr Gly Val				
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Phe Asp Ile Val Lys Gly Gln Ile Gln Val Ala Ser Asp Asn Ile Lys				
	660		665	670
Asp Cys Val Lys Cys Phe Ile Asp Val Val Asn Lys Ala Leu Glu Met				
	675		680	685

Cys Ile Asp Gln Val Thr Ile Ala Gly Ala Lys Leu Arg Ser Leu Asn
 690 695 700

Leu Gly Glu Val Phe Ile Ala Gln Ser Lys Gly Leu Tyr Arg Gln Cys
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Ile Arg Gly Lys Glu Gln Leu Gln Leu Leu Met Pro Leu Lys Ala Pro
 725 730 735

Lys Glu Val Thr Phe Leu Glu Gly Asp Ser His Asp Thr Val Leu Thr
 740 745 750

Ser Glu Glu Val Val Leu Lys Asn Gly Glu Leu Glu Ala Leu Glu Thr
 755 760 765

Pro Val Asp Ser Phe Thr Asn Gly Ala Ile Val Gly Thr Pro Val Cys
 770 775 780

Val Asn Gly Leu Met Leu Leu Glu Ile Lys Asp Lys Glu Gln Tyr Cys
 785 790 795 800

Ala Leu Ser Pro Gly Leu Leu Ala Thr Asn Asn Val Phe Arg Leu Lys
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Gly Gly Ala Pro Ile Lys Gly Val Thr Phe Gly Glu Asp Thr Val Trp
 820 825 830

Glu Val Gln Gly Tyr Lys Asn Val Arg Ile Thr Phe Glu Leu Asp Glu
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Arg Val Asp Lys Val Leu Asn Glu Lys Cys Ser Val Tyr Thr Val Glu
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Val Lys Thr Leu Gln Pro Val Ser Asp Leu Leu Thr Asn Met Gly Ile
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Glu Thr Cys Glu His Glu Tyr Gly Thr Glu Asp Asp Tyr Gln Gly Leu
 945 950 955 960

Pro Leu Glu Phe Gly Ala Ser Ala Glu Thr Val Arg Val Glu Glu Glu
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 980 985 990

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Tyr Leu Lys Leu Thr Asp Asn Val Ala Ile Lys Cys Val Asp Ile
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Val Lys Glu Ala Gln Ser Ala Asn Pro Met Val Ile Val Asn Ala
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Asn Lys Ala Thr Asn Gly Ala Met Gln Lys Glu Ser Asp Asp Tyr
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Ser Gly His Asn Leu Ala Lys Lys Cys Leu His Val Val Gly Pro
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Asn Leu Asn Ala Gly Glu Asp Ile Gln Leu Leu Lys Ala Ala Tyr
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Glu Asn Phe Asn Ser Gln Asp Ile Leu Leu Ala Pro Leu Leu Ser
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Ala Leu	Tyr Glu Gln Val	Val Met Asp Tyr Leu Asp	Asn Leu Lys	
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Pro Arg	Val Glu Ala Pro	Lys Gln Glu Glu Pro	Pro Asn Thr Glu	
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Asp Ser	Lys Thr Glu Glu	Lys Ser Val Val Gln	Lys Pro Val Asp	
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Val Lys	Pro Lys Ile Lys	Ala Cys Ile Asp Glu	Val Thr Thr Thr	
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Leu Glu	Glu Thr Lys Phe	Leu Thr Asn Lys Leu	Leu Leu Phe Ala	
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Asp Ile	Asn Gly Lys Leu	Tyr His Asp Ser Gln	Asn Met Leu Arg	
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Gly Glu	Asp Met Ser Phe	Leu Glu Lys Asp Ala	Pro Tyr Met Val	
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Ser Lys	Lys Ala Gly Gly	Thr Thr Glu Met Leu	Ser Arg Ala Leu	
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Lys Lys	Val Pro Val Asp	Glu Tyr Ile Thr Thr	Tyr Pro Gly Gln	
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Gly Cys	Ala Gly Tyr Thr	Leu Glu Glu Ala Lys	Thr Ala Leu Lys	
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Lys Cys	Lys Ser Ala Phe	Tyr Val Leu Pro Ser	Glu Ala Pro Asn	
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Ala Lys	Glu Glu Ile Leu	Gly Thr Val Ser Trp	Asn Leu Arg Glu	

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Gly Ile Lys Ile Gln Glu Gly Ile Val Asp Tyr Gly Val Arg Phe				
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Phe Phe Tyr Thr Ser Lys Glu Pro Val Ala Ser Ile Ile Thr Lys				
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Val Thr His Gly Phe Asn Leu Glu Glu Ala Ala Arg Cys Met Arg				
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Ser Leu Lys Ala Pro Ala Val Val Ser Val Ser Ser Pro Asp Ala				
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Val Thr Thr Tyr Asn Gly Tyr Leu Thr Ser Ser Ser Lys Thr Ser				
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Glu Glu His Phe Val Glu Thr Val Ser Leu Ala Gly Ser Tyr Arg				
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Asp Trp Ser Tyr Ser Gly Gln Arg Thr Glu Leu Gly Val Glu Phe				
1490		1495		1500
Leu Lys Arg Gly Asp Lys Ile Val Tyr His Thr Leu Glu Ser Pro				
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Val Glu Phe His Leu Asp Gly Glu Val Leu Ser Leu Asp Lys Leu				
1520		1525		1530
Lys Ser Leu Leu Ser Leu Arg Glu Val Lys Thr Ile Lys Val Phe				
1535		1540		1545
Thr Thr Val Asp Asn Thr Asn Leu His Thr Gln Leu Val Asp Met				
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1985						1990					1995			
Ser	Asn	Ser	Phe	Glu	Val	Leu	Ala	Val	Glu	Asp	Thr	Gln	Gly	Met
2000						2005					2010			
Asp	Asn	Leu	Ala	Cys	Glu	Ser	Gln	Gln	Pro	Thr	Ser	Glu	Glu	Val
2015						2020					2025			
Val	Glu	Asn	Pro	Thr	Ile	Gln	Lys	Glu	Val	Ile	Glu	Cys	Asp	Val
2030						2035					2040			
Lys	Thr	Thr	Glu	Val	Val	Gly	Asn	Val	Ile	Leu	Lys	Pro	Ser	Asp
2045						2050					2055			
Glu	Gly	Val	Lys	Val	Thr	Gln	Glu	Leu	Gly	His	Glu	Asp	Leu	Met
2060						2065					2070			
Ala	Ala	Tyr	Val	Glu	Asn	Thr	Ser	Ile	Thr	Ile	Lys	Lys	Pro	Asn
2075						2080					2085			
Glu	Leu	Ser	Leu	Ala	Leu	Gly	Leu	Lys	Thr	Ile	Ala	Thr	His	Gly
2090						2095					2100			
Ile	Ala	Ala	Ile	Asn	Ser	Val	Pro	Trp	Ser	Lys	Ile	Leu	Ala	Tyr
2105						2110					2115			
Val	Lys	Pro	Phe	Leu	Gly	Gln	Ala	Ala	Ile	Thr	Thr	Ser	Asn	Cys
2120						2125					2130			
Ala	Lys	Arg	Leu	Ala	Gln	Arg	Val	Phe	Asn	Asn	Tyr	Met	Pro	Tyr
2135						2140					2145			
Val	Phe	Thr	Leu	Leu	Phe	Gln	Leu	Cys	Thr	Phe	Thr	Lys	Ser	Thr
2150						2155					2160			
Asn	Ser	Arg	Ile	Arg	Ala	Ser	Leu	Pro	Thr	Thr	Ile	Ala	Lys	Asn
2165						2170					2175			
Ser	Val	Lys	Ser	Val	Ala	Lys	Leu	Cys	Leu	Asp	Ala	Gly	Ile	Asn
2180						2185					2190			
Tyr	Val	Lys	Ser	Pro	Lys	Phe	Ser	Lys	Leu	Phe	Thr	Ile	Ala	Met

2195						2200						2205			
Trp	Leu	Leu	Leu	Leu	Ser	Ile	Cys	Leu	Gly	Ser	Leu	Ile	Cys	Val	
2210						2215					2220				
Thr	Ala	Ala	Phe	Gly	Val	Leu	Leu	Ser	Asn	Phe	Gly	Ala	Pro	Ser	
2225						2230					2235				
Tyr	Cys	Asn	Gly	Val	Arg	Glu	Leu	Tyr	Leu	Asn	Ser	Ser	Asn	Val	
2240						2245					2250				
Thr	Thr	Met	Asp	Phe	Cys	Glu	Gly	Ser	Phe	Pro	Cys	Ser	Ile	Cys	
2255						2260					2265				
Leu	Ser	Gly	Leu	Asp	Ser	Leu	Asp	Ser	Tyr	Pro	Ala	Leu	Glu	Thr	
2270						2275					2280				
Ile	Gln	Val	Thr	Ile	Ser	Ser	Tyr	Lys	Leu	Asp	Leu	Thr	Ile	Leu	
2285						2290					2295				
Gly	Leu	Ala	Ala	Glu	Trp	Val	Leu	Ala	Tyr	Met	Leu	Phe	Thr	Lys	
2300						2305					2310				
Phe	Phe	Tyr	Leu	Leu	Gly	Leu	Ser	Ala	Ile	Met	Gln	Val	Phe	Phe	
2315						2320					2325				
Gly	Tyr	Phe	Ala	Ser	His	Phe	Ile	Ser	Asn	Ser	Trp	Leu	Met	Trp	
2330						2335					2340				
Phe	Ile	Ile	Ser	Ile	Val	Gln	Met	Ala	Pro	Val	Ser	Ala	Met	Val	
2345						2350					2355				
Arg	Met	Tyr	Ile	Phe	Phe	Ala	Ser	Phe	Tyr	Tyr	Ile	Trp	Lys	Ser	
2360						2365					2370				
Tyr	Val	His	Ile	Met	Asp	Gly	Cys	Thr	Ser	Ser	Thr	Cys	Met	Met	
2375						2380					2385				
Cys	Tyr	Lys	Arg	Asn	Arg	Ala	Thr	Arg	Val	Glu	Cys	Thr	Thr	Ile	
2390						2395					2400				
Val	Asn	Gly	Met	Lys	Arg	Ser	Phe	Tyr	Val	Tyr	Ala	Asn	Gly	Gly	
2405						2410					2415				

Arg Gly	Phe Cys Lys Thr	His	Asn Trp Asn Cys	Leu	Asn Cys Asp
2420		2425		2430	
Thr Phe	Cys Thr Gly Ser	Thr	Phe Ile Ser Asp	Glu	Val Ala Arg
2435		2440		2445	
Asp Leu	Ser Leu Gln Phe	Lys	Arg Pro Ile Asn	Pro	Thr Asp Gln
2450		2455		2460	
Ser Ser	Tyr Ile Val Asp	Ser	Val Ala Val Lys	Asn	Gly Ala Leu
2465		2470		2475	
His Leu	Tyr Phe Asp Lys	Ala	Gly Gln Lys Thr	Tyr	Glu Arg His
2480		2485		2490	
Pro Leu	Ser His Phe Val	Asn	Leu Asp Asn Leu	Arg	Ala Asn Asn
2495		2500		2505	
Thr Lys	Gly Ser Leu Pro	Ile	Asn Val Ile Val	Phe	Asp Gly Lys
2510		2515		2520	
Ser Lys	Cys Asp Glu Ser	Ala	Ser Lys Ser Ala	Ser	Val Tyr Tyr
2525		2530		2535	
Ser Gln	Leu Met Cys Gln	Pro	Ile Leu Leu Leu	Asp	Gln Val Leu
2540		2545		2550	
Val Ser	Asp Val Gly Asp	Ser	Thr Glu Val Ser	Val	Lys Met Phe
2555		2560		2565	
Asp Ala	Tyr Val Asp Thr	Phe	Ser Ala Thr Phe	Ser	Val Pro Met
2570		2575		2580	
Glu Lys	Leu Lys Ala Leu	Val	Ala Thr Ala His	Ser	Glu Leu Ala
2585		2590		2595	
Lys Gly	Val Ala Leu Asp	Gly	Val Leu Ser Thr	Phe	Val Ser Ala
2600		2605		2610	
Ala Arg	Gln Gly Val Val	Asp	Thr Asp Val Asp	Thr	Lys Asp Val
2615		2620		2625	

Ile	Glu	Cys	Leu	Lys	Leu	Ser	His	His	Ser	Asp	Leu	Glu	Val	Thr
2630						2635					2640			
Gly	Asp	Ser	Cys	Asn	Asn	Phe	Met	Leu	Thr	Tyr	Asn	Lys	Val	Glu
2645						2650					2655			
Asn	Met	Thr	Pro	Arg	Asp	Leu	Gly	Ala	Cys	Ile	Asp	Cys	Asn	Ala
2660						2665					2670			
Arg	His	Ile	Asn	Ala	Gln	Val	Ala	Lys	Ser	His	Asn	Val	Ser	Leu
2675						2680					2685			
Ile	Trp	Asn	Val	Lys	Asp	Tyr	Met	Ser	Leu	Ser	Glu	Gln	Leu	Arg
2690						2695					2700			
Lys	Gln	Ile	Arg	Ser	Ala	Ala	Lys	Lys	Asn	Asn	Ile	Pro	Phe	Arg
2705						2710					2715			
Leu	Thr	Cys	Ala	Thr	Thr	Arg	Gln	Val	Val	Asn	Val	Ile	Thr	Thr
2720						2725					2730			
Lys	Ile	Ser	Leu	Lys	Gly	Gly	Lys	Ile	Val	Ser	Thr	Cys	Phe	Lys
2735						2740					2745			
Leu	Met	Leu	Lys	Ala	Thr	Leu	Leu	Cys	Val	Leu	Ala	Ala	Leu	Val
2750						2755					2760			
Cys	Tyr	Ile	Val	Met	Pro	Val	His	Thr	Leu	Ser	Ile	His	Asp	Gly
2765						2770					2775			
Tyr	Thr	Asn	Glu	Ile	Ile	Gly	Tyr	Lys	Ala	Ile	Gln	Asp	Gly	Val
2780						2785					2790			
Thr	Arg	Asp	Ile	Ile	Ser	Thr	Asp	Asp	Cys	Phe	Ala	Asn	Lys	His
2795						2800					2805			
Ala	Gly	Phe	Asp	Ala	Trp	Phe	Ser	Gln	Arg	Gly	Gly	Ser	Tyr	Lys
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Asn	Asp	Lys	Ser	Cys	Pro	Val	Val	Ala	Ala	Ile	Ile	Thr	Arg	Glu
2825						2830					2835			

Ile Gly	Phe Ile Val Pro Gly	Leu Pro Gly Thr Val	Leu Arg Ala
2840	2845	2850	
Ile Asn	Gly Asp Phe Leu His	Phe Leu Pro Arg Val	Phe Ser Ala
2855	2860	2865	
Val Gly	Asn Ile Cys Tyr Thr	Pro Ser Lys Leu Ile	Glu Tyr Ser
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Asp Phe	Ala Thr Ser Ala Cys	Val Leu Ala Ala Glu	Cys Thr Ile
2885	2890	2895	
Phe Lys	Asp Ala Met Gly Lys	Pro Val Pro Tyr Cys	Tyr Asp Thr
2900	2905	2910	
Asn Leu	Leu Glu Gly Ser Ile	Ser Tyr Ser Glu Leu	Arg Pro Asp
2920	2925		2915
Thr Arg	Tyr Val Leu Met Asp	Gly Ser Ile Ile Gln	Phe Pro Asn
2930	2935	2940	
Thr Tyr	Leu Glu Gly Ser Val	Arg Val Val Thr Thr	Phe Asp Ala
2945	2950	2955	
Glu Tyr	Cys Arg His Gly Thr	Cys Glu Arg Ser Glu	Val Gly Ile
2960	2965	2970	
Cys Leu	Ser Thr Ser Gly Arg	Trp Val Leu Asn Asn	Glu His Tyr
2975	2980	2985	
Arg Ala	Leu Ser Gly Val Phe	Cys Gly Val Asp Ala	Met Asn Leu
2990	2995	3000	
Ile Ala	Asn Ile Phe Thr Pro	Leu Val Gln Pro Val	Gly Ala Leu
3005	3010	3015	
Asp Val	Ser Ala Ser Val Val	Ala Gly Gly Ile Ile	Ala Ile Leu
3020	3025	3030	
Val Thr	Cys Ala Ala Tyr Tyr	Phe Met Lys Phe Arg	Arg Val Phe
3035	3040	3045	
Gly Glu	Tyr Asn His Val Val	Ala Ala Asn Ala Leu	Leu Phe Leu

3050		3055		3060
Met Ser Phe Thr Ile Leu Cys	Leu Val Pro Ala Tyr	Ser Phe Leu		
3065	3070	3075		
Pro Gly Val Tyr Ser Val Phe	Tyr Leu Tyr Leu Thr	Phe Tyr Phe		
3080	3085	3090		
Thr Asn Asp Val Ser Phe Leu	Ala His Leu Gln Trp	Phe Ala Met		
3095	3100	3105		
Phe Ser Pro Ile Val Pro Phe	Trp Ile Thr Ala Ile	Tyr Val Phe		
3110	3115	3120		
Cys Ile Ser Leu Lys His Cys	His Trp Phe Phe Asn	Asn Tyr Leu		
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Arg Lys Arg Val Met Phe Asn	Gly Val Thr Phe Ser	Thr Phe Glu		
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Glu Ala Ala Leu Cys Thr Phe	Leu Leu Asn Lys Glu	Met Tyr Leu		
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Lys Leu Arg Ser Glu Thr Leu	Leu Pro Leu Thr Gln	Tyr Asn Arg		
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Tyr Leu Ala Leu Tyr Asn Lys	Tyr Lys Tyr Phe Ser	Gly Ala Leu		
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Asp Thr Thr Ser Tyr Arg Glu	Ala Ala Cys Cys His	Leu Ala Lys		
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Ala Leu Asn Asp Phe Ser Asn	Ser Gly Ala Asp Val	Leu Tyr Gln		
3215	3220	3225		
Pro Pro Gln Thr Ser Ile Thr	Ser Ala Val Leu Gln	Ser Gly Phe		
3230	3235	3240		
Arg Lys Met Ala Phe Pro Ser	Gly Lys Val Glu Gly	Cys Met Val		
3245	3250	3255		
Gln Val Thr Cys Gly Thr Thr	Thr Leu Asn Gly Leu	Trp Leu Asp		
3260	3265	3270		

Asp Thr	Val Tyr Cys	Pro Arg	His Val Ile Cys	Thr	Ala Glu Asp
3275		3280		3285	
Met Leu	Asn Pro Asn Tyr	Glu	Asp Leu Leu Ile	Arg	Lys Ser Asn
3290		3295		3300	
His Ser	Phe Leu Val Gln	Ala	Gly Asn Val Gln	Leu	Arg Val Ile
3305		3310		3315	
Gly His	Ser Met Gln Asn	Cys	Leu Leu Arg Leu	Lys	Val Asp Thr
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Ser Asn	Pro Lys Thr Pro	Lys	Tyr Lys Phe Val	Arg	Ile Gln Pro
3335		3340		3345	
Gly Gln	Thr Phe Ser Val	Leu	Ala Cys Tyr Asn	Gly	Ser Pro Ser
3350		3355		3360	
Gly Val	Tyr Gln Cys Ala	Met	Arg Pro Asn His	Thr	Ile Lys Gly
3365		3370		3375	
Ser Phe	Leu Asn Gly Ser	Cys	Gly Ser Val Gly	Phe	Asn Ile Asp
3380		3385		3390	
Tyr Asp	Cys Val Ser Phe	Cys	Tyr Met His His	Met	Glu Leu Pro
3395		3400		3405	
Thr Gly	Val His Ala Gly	Thr	Asp Leu Glu Gly	Lys	Phe Tyr Gly
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Pro Phe	Val Asp Arg Gln	Thr	Ala Gln Ala Ala	Gly	Thr Asp Thr
3425		3430		3435	
Thr Ile	Thr Leu Asn Val	Leu	Ala Trp Leu Tyr	Ala	Ala Val Ile
3440		3445		3450	
Asn Gly	Asp Arg Trp Phe	Leu	Asn Arg Phe Thr	Thr	Thr Leu Asn
3455		3460		3465	
Asp Phe	Asn Leu Val Ala	Met	Lys Tyr Asn Tyr	Glu	Pro Leu Thr
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Gln Asp	His Val Asp Ile	Leu	Gly Pro Leu Ser	Ala	Gln Thr Gly
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Ile Ala	Val Leu Asp Met	Cys	Ala Ala Leu Lys	Glu	Leu Leu Gln
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Asn Gly	Met Asn Gly Arg	Thr	Ile Leu Gly Ser	Thr	Ile Leu Glu
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Asp Glu	Phe Thr Pro Phe	Asp	Val Val Arg Gln	Cys	Ser Gly Val
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Thr Phe	Gln Gly Lys Phe	Lys	Lys Ile Val Lys	Gly	Thr His His
3545		3550		3555	
Trp Met	Leu Leu Thr Phe	Leu	Thr Ser Leu Leu	Ile	Leu Val Gln
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Ser Thr	Gln Trp Ser Leu	Phe	Phe Phe Val Tyr	Glu	Asn Ala Phe
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Leu Pro	Phe Thr Leu Gly	Ile	Met Ala Ile Ala	Ala	Cys Ala Met
3590		3595		3600	
Leu Leu	Val Lys His Lys	His	Ala Phe Leu Cys	Leu	Phe Leu Leu
3605		3610		3615	
Pro Ser	Leu Ala Thr Val	Ala	Tyr Phe Asn Met	Val	Tyr Met Pro
3620		3625		3630	
Ala Ser	Trp Val Met Arg	Ile	Met Thr Trp Leu	Glu	Leu Ala Asp
3635		3640		3645	
Thr Ser	Leu Ser Gly Tyr	Arg	Leu Lys Asp Cys	Val	Met Tyr Ala
3650		3655		3660	
Ser Ala	Leu Val Leu Leu	Ile	Leu Met Thr Ala	Arg	Thr Val Tyr
3665		3670		3675	
Asp Asp	Ala Ala Arg Arg	Val	Trp Thr Leu Met	Asn	Val Ile Thr
3680		3685		3690	

Leu	Val	Tyr	Lys	Val	Tyr	Tyr	Gly	Asn	Ala	Leu	Asp	Gln	Ala	Ile
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Ser	Met	Trp	Ala	Leu	Val	Ile	Ser	Val	Thr	Ser	Asn	Tyr	Ser	Gly
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Cys	Val	Glu	Tyr	Tyr	Pro	Leu	Leu	Phe	Ile	Thr	Gly	Asn	Thr	Leu
3740						3745					3750			
Gln	Cys	Ile	Met	Leu	Val	Tyr	Cys	Phe	Leu	Gly	Tyr	Cys	Cys	Cys
3755						3760					3765			
Cys	Tyr	Phe	Gly	Leu	Phe	Cys	Leu	Leu	Asn	Arg	Tyr	Phe	Arg	Leu
3770						3775					3780			
Thr	Leu	Gly	Val	Tyr	Asp	Tyr	Leu	Val	Ser	Thr	Gln	Glu	Phe	Arg
3785						3790					3795			
Tyr	Met	Asn	Ser	Gln	Gly	Leu	Leu	Pro	Pro	Lys	Ser	Ser	Ile	Asp
3800						3805					3810			
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3815						3820					3825			
Cys	Ile	Lys	Val	Ala	Thr	Val	Gln	Ser	Lys	Met	Ser	Asp	Val	Lys
3830						3835					3840			
Cys	Thr	Ser	Val	Val	Leu	Leu	Ser	Val	Leu	Gln	Gln	Leu	Arg	Val
3845						3850					3855			
Glu	Ser	Ser	Ser	Lys	Leu	Trp	Ala	Gln	Cys	Val	Gln	Leu	His	Asn
3860						3865					3870			
Asp	Ile	Leu	Leu	Ala	Lys	Asp	Thr	Thr	Glu	Ala	Phe	Glu	Lys	Met
3875						3880					3885			
Val	Ser	Leu	Leu	Ser	Val	Leu	Leu	Ser	Met	Gln	Gly	Ala	Val	Asp
3890						3895					3900			
Ile	Asn	Arg	Leu	Cys	Glu	Glu	Met	Leu	Asp	Asn	Arg	Ala	Thr	Leu

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Gln Ala	Ile Ala Ser Glu Phe	Ser Ser Leu Pro Ser	Tyr Ala Ala	
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Tyr Ala	Thr Ala Gln Glu Ala	Tyr Glu Gln Ala Val	Ala Asn Gly	
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Asp Ser	Glu Val Val Leu Lys	Lys Leu Lys Lys Ser	Leu Asn Val	
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Ala Lys	Ser Glu Phe Asp Arg	Asp Ala Ala Met Gln	Arg Lys Leu	
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Glu Lys	Met Ala Asp Gln Ala	Met Thr Gln Met Tyr	Lys Gln Ala	
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Arg Ser	Glu Asp Lys Arg Ala	Lys Val Thr Ser Ala	Met Gln Thr	
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Met Leu	Phe Thr Met Leu Arg	Lys Leu Asp Asn Asp	Ala Leu Asn	
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Asn Ile	Ile Asn Asn Ala Arg	Asp Gly Cys Val Pro	Leu Asn Ile	
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Ile Pro	Leu Thr Thr Ala Ala	Lys Leu Met Val Val	Val Pro Asp	
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Tyr Gly	Thr Tyr Lys Asn Thr	Cys Asp Gly Asn Thr	Phe Thr Tyr	
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Ala Ser	Ala Leu Trp Glu Ile	Gln Gln Val Val Asp	Ala Asp Ser	
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Lys Ile	Val Gln Leu Ser Glu	Ile Asn Met Asp Asn	Ser Pro Asn	
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Leu Ala	Trp Pro Leu Ile Val	Thr Ala Leu Arg Ala	Asn Ser Ala	
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Val Lys	Leu Gln Asn Asn Glu	Leu Ser Pro Val Ala	Leu Arg Gln	
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Met	Ser	Cys	Ala	Ala	Gly	Thr	Thr	Gln	Thr	Ala	Cys	Thr	Asp	Asp
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Asn	Ala	Leu	Ala	Tyr	Tyr	Asn	Asn	Ser	Lys	Gly	Gly	Arg	Phe	Val
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Leu	Ala	Leu	Leu	Ser	Asp	His	Gln	Asp	Leu	Lys	Trp	Ala	Arg	Phe
4160						4165					4170			
Pro	Lys	Ser	Asp	Gly	Thr	Gly	Thr	Ile	Tyr	Thr	Glu	Leu	Glu	Pro
4175						4180					4185			
Pro	Cys	Arg	Phe	Val	Thr	Asp	Thr	Pro	Lys	Gly	Pro	Lys	Val	Lys
4190						4195					4200			
Tyr	Leu	Tyr	Phe	Ile	Lys	Gly	Leu	Asn	Asn	Leu	Asn	Arg	Gly	Met
4205						4210					4215			
Val	Leu	Gly	Ser	Leu	Ala	Ala	Thr	Val	Arg	Leu	Gln	Ala	Gly	Asn
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Ala	Thr	Glu	Val	Pro	Ala	Asn	Ser	Thr	Val	Leu	Ser	Phe	Cys	Ala
4235						4240					4245			
Phe	Ala	Val	Asp	Pro	Ala	Lys	Ala	Tyr	Lys	Asp	Tyr	Leu	Ala	Ser
4250						4255					4260			
Gly	Gly	Gln	Pro	Ile	Thr	Asn	Cys	Val	Lys	Met	Leu	Cys	Thr	His
4265						4270					4275			
Thr	Gly	Thr	Gly	Gln	Ala	Ile	Thr	Val	Thr	Pro	Glu	Ala	Asn	Met
4280						4285					4290			
Asp	Gln	Glu	Ser	Phe	Gly	Gly	Ala	Ser	Cys	Cys	Leu	Tyr	Cys	Arg
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Cys	His	Ile	Asp	His	Pro	Asn	Pro	Lys	Gly	Phe	Cys	Asp	Leu	Lys
4310						4315					4320			
Gly	Lys	Tyr	Val	Gln	Ile	Pro	Thr	Thr	Cys	Ala	Asn	Asp	Pro	Val
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Gly Phe Thr Leu Arg Asn Thr Val Cys Thr Val Cys Gly Met Trp
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Gln Ser Ala Asp Ala Ser Thr Phe Leu Asn Gly Phe Ala Val
 4370 4375 4380

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 <211> 2695
 <212> PRT
 <213> Coronavirus

<400> 3

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Thr Ser Thr Asp Val Val Tyr Arg Ala Phe Asp Ile Tyr Asn Glu Lys
 20 25 30

Val Ala Gly Phe Ala Lys Phe Leu Lys Thr Asn Cys Cys Arg Phe Gln
 35 40 45

Glu Lys Asp Glu Glu Gly Asn Leu Leu Asp Ser Tyr Phe Val Val Lys
 50 55 60

Arg His Thr Met Ser Asn Tyr Gln His Glu Glu Thr Ile Tyr Asn Leu
 65 70 75 80

Val Lys Asp Cys Pro Ala Val Ala Val His Asp Phe Phe Lys Phe Arg
 85 90 95

Val Asp Gly Asp Met Val Pro His Ile Ser Arg Gln Arg Leu Thr Lys
 100 105 110

Tyr Thr Met Ala Asp Leu Val Tyr Ala Leu Arg His Phe Asp Glu Gly
 115 120 125

Asn Cys Asp Thr Leu Lys Glu Ile Leu Val Thr Tyr Asn Cys Cys Asp
 130 135 140

Asp Asp Tyr Phe Asn Lys Lys Asp Trp Tyr Asp Phe Val Glu Asn Pro
 145 150 155 160

Asp Ile Leu Arg Val Tyr Ala Asn Leu Gly Glu Arg Val Arg Gln Ser
165 170 175

Leu Leu Lys Thr Val Gln Phe Cys Asp Ala Met Arg Asp Ala Gly Ile
180 185 190

Val Gly Val Leu Thr Leu Asp Asn Gln Asp Leu Asn Gly Asn Trp Tyr
195 200 205

Asp Phe Gly Asp Phe Val Gln Val Ala Pro Gly Cys Gly Val Pro Ile
210 215 220

Val Asp Ser Tyr Tyr Ser Leu Leu Met Pro Ile Leu Thr Leu Thr Arg
225 230 235 240

Ala Leu Ala Ala Glu Ser His Met Asp Ala Asp Leu Ala Lys Pro Leu
245 250 255

Ile Lys Trp Asp Leu Leu Lys Tyr Asp Phe Thr Glu Glu Arg Leu Cys
260 265 270

Leu Phe Asp Arg Tyr Phe Lys Tyr Trp Asp Gln Thr Tyr His Pro Asn
275 280 285

Cys Ile Asn Cys Leu Asp Asp Arg Cys Ile Leu His Cys Ala Asn Phe
290 295 300

Asn Val Leu Phe Ser Thr Val Phe Pro Pro Thr Ser Phe Gly Pro Leu
305 310 315 320

Val Arg Lys Ile Phe Val Asp Gly Val Pro Phe Val Val Ser Thr Gly
325 330 335

Tyr His Phe Arg Glu Leu Gly Val Val His Asn Gln Asp Val Asn Leu
340 345 350

His Ser Ser Arg Leu Ser Phe Lys Glu Leu Leu Val Tyr Ala Ala Asp
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Pro Ala Met His Ala Ala Ser Gly Asn Leu Leu Leu Asp Lys Arg Thr
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Thr Cys Phe Ser Val Ala Ala Leu Thr Asn Asn Val Ala Phe Gln Thr
 385 390 395 400

Val Lys Pro Gly Asn Phe Asn Lys Asp Phe Tyr Asp Phe Ala Val Ser
 405 410 415

Lys Gly Phe Phe Lys Glu Gly Ser Ser Val Glu Leu Lys His Phe Phe
 420 425 430

Phe Ala Gln Asp Gly Asn Ala Ala Ile Ser Asp Tyr Asp Tyr Tyr Arg
 435 440 445

Tyr Asn Leu Pro Thr Met Cys Asp Ile Arg Gln Leu Leu Phe Val Val
 450 455 460

Glu Val Val Asp Lys Tyr Phe Asp Cys Tyr Asp Gly Gly Cys Ile Asn
 465 470 475 480

Ala Asn Gln Val Ile Val Asn Asn Leu Asp Lys Ser Ala Gly Phe Pro
 485 490 495

Phe Asn Lys Trp Gly Lys Ala Arg Leu Tyr Tyr Asp Ser Met Ser Tyr
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Glu Asp Gln Asp Ala Leu Phe Ala Tyr Thr Lys Arg Asn Val Ile Pro
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Thr Ile Thr Gln Met Asn Leu Lys Tyr Ala Ile Ser Ala Lys Asn Arg
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Ala Arg Thr Val Ala Gly Val Ser Ile Cys Ser Thr Met Thr Asn Arg
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Gln Phe His Gln Lys Leu Leu Lys Ser Ile Ala Ala Thr Arg Gly Ala
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Thr Val Val Ile Gly Thr Ser Lys Phe Tyr Gly Gly Trp His Asn Met
 580 585 590

Leu Lys Thr Val Tyr Ser Asp Val Glu Thr Pro His Leu Met Gly Trp
 595 600 605

Asp Tyr Pro Lys Cys Asp Arg Ala Met Pro Asn Met Leu Arg Ile Met
 610 615 620

Ala Ser Leu Val Leu Ala Arg Lys His Asn Thr Cys Cys Asn Leu Ser
 625 630 635 640

His Arg Phe Tyr Arg Leu Ala Asn Glu Cys Ala Gln Val Leu Ser Glu
 645 650 655

Met Val Met Cys Gly Gly Ser Leu Tyr Val Lys Pro Gly Gly Thr Ser
 660 665 670

Ser Gly Asp Ala Thr Thr Ala Tyr Ala Asn Ser Val Phe Asn Ile Cys
 675 680 685

Gln Ala Val Thr Ala Asn Val Asn Ala Leu Leu Ser Thr Asp Gly Asn
 690 695 700

Lys Ile Ala Asp Lys Tyr Val Arg Asn Leu Gln His Arg Leu Tyr Glu
 705 710 715 720

Cys Leu Tyr Arg Asn Arg Asp Val Asp His Glu Phe Val Asp Glu Phe
 725 730 735

Tyr Ala Tyr Leu Arg Lys His Phe Ser Met Met Ile Leu Ser Asp Asp
 740 745 750

Ala Val Val Cys Tyr Asn Ser Asn Tyr Ala Ala Gln Gly Leu Val Ala
 755 760 765

Ser Ile Lys Asn Phe Lys Ala Val Leu Tyr Tyr Gln Asn Asn Val Phe
 770 775 780

Met Ser Glu Ala Lys Cys Trp Thr Glu Thr Asp Leu Thr Lys Gly Pro
 785 790 795 800

His Glu Phe Cys Ser Gln His Thr Met Leu Val Lys Gln Gly Asp Asp
 805 810 815

Tyr Val Tyr Leu Pro Tyr Pro Asp Pro Ser Arg Ile Leu Gly Ala Gly
 820 825 830

Cys Phe Val Asp Asp Ile Val Lys Thr Asp Gly Thr Leu Met Ile Glu
 835 840 845

Arg Phe Val Ser Leu Ala Ile Asp Ala Tyr Pro Leu Thr Lys His Pro
 850 855 860

Asn Gln Glu Tyr Ala Asp Val Phe His Leu Tyr Leu Gln Tyr Ile Arg
 865 870 875 880

Lys Leu His Asp Glu Leu Thr Gly His Met Leu Asp Met Tyr Ser Val
 885 890 895

Met Leu Thr Asn Asp Asn Thr Ser Arg Tyr Trp Glu Pro Glu Phe Tyr
 900 905 910

Glu Ala Met Tyr Thr Pro His Thr Val Leu Gln Ala Val Gly Ala Cys
 915 920 925

Val Leu Cys Asn Ser Gln Thr Ser Leu Arg Cys Gly Ala Cys Ile Arg
 930 935 940

Arg Pro Phe Leu Cys Cys Lys Cys Cys Tyr Asp His Val Ile Ser Thr
 945 950 955 960

Ser His Lys Leu Val Leu Ser Val Asn Pro Tyr Val Cys Asn Ala Pro
 965 970 975

Gly Cys Asp Val Thr Asp Val Thr Gln Leu Tyr Leu Gly Gly Met Ser
 980 985 990

Tyr Tyr Cys Lys Ser His Lys Pro Pro Ile Ser Phe Pro Leu Cys Ala
 995 1000 1005

Asn Gly Gln Val Phe Gly Leu Tyr Lys Asn Thr Cys Val Gly Ser
 1010 1015 1020

Asp Asn Val Thr Asp Phe Asn Ala Ile Ala Thr Cys Asp Trp Thr
 1025 1030 1035

Asn Ala Gly Asp Tyr Ile Leu Ala Asn Thr Cys Thr Glu Arg Leu
 1040 1045 1050

Lys Leu Phe Ala Ala Glu Thr Leu Lys Ala Thr Glu Glu Thr Phe
 1055 1060 1065

Lys	Leu	Ser	Tyr	Gly	Ile	Ala	Thr	Val	Arg	Glu	Val	Leu	Ser	Asp
1070						1075					1080			
Arg	Glu	Leu	His	Leu	Ser	Trp	Glu	Val	Gly	Lys	Pro	Arg	Pro	Pro
1085						1090					1095			
Leu	Asn	Arg	Asn	Tyr	Val	Phe	Thr	Gly	Tyr	Arg	Val	Thr	Lys	Asn
1100						1105					1110			
Ser	Lys	Val	Gln	Ile	Gly	Glu	Tyr	Thr	Phe	Glu	Lys	Gly	Asp	Tyr
1115						1120					1125			
Gly	Asp	Ala	Val	Val	Tyr	Arg	Gly	Thr	Thr	Thr	Tyr	Lys	Leu	Asn
1130						1135					1140			
Val	Gly	Asp	Tyr	Phe	Val	Leu	Thr	Ser	His	Thr	Val	Met	Pro	Leu
1145						1150					1155			
Ser	Ala	Pro	Thr	Leu	Val	Pro	Gln	Glu	His	Tyr	Val	Arg	Ile	Thr
1160						1165					1170			
Gly	Leu	Tyr	Pro	Thr	Leu	Asn	Ile	Ser	Asp	Glu	Phe	Ser	Ser	Asn
1175						1180					1185			
Val	Ala	Asn	Tyr	Gln	Lys	Val	Gly	Met	Gln	Lys	Tyr	Ser	Thr	Leu
1190						1195					1200			
Gln	Gly	Pro	Pro	Gly	Thr	Gly	Lys	Ser	His	Phe	Ala	Ile	Gly	Leu
1205						1210					1215			
Ala	Leu	Tyr	Tyr	Pro	Ser	Ala	Arg	Ile	Val	Tyr	Thr	Ala	Cys	Ser
1220						1225					1230			
His	Ala	Ala	Val	Asp	Ala	Leu	Cys	Glu	Lys	Ala	Leu	Lys	Tyr	Leu
1235						1240					1245			
Pro	Ile	Asp	Lys	Cys	Ser	Arg	Ile	Ile	Pro	Ala	Arg	Ala	Arg	Val
1250						1255					1260			
Glu	Cys	Phe	Asp	Lys	Phe	Lys	Val	Asn	Ser	Thr	Leu	Glu	Gln	Tyr
1265						1270					1275			
Val	Phe	Cys	Thr	Val	Asn	Ala	Leu	Pro	Glu	Thr	Thr	Ala	Asp	Ile

1280		1285		1290
Val Val Phe Asp Glu Ile Ser Met Ala Thr Asn Tyr Asp Leu Ser				
1295		1300		1305
Val Val Asn Ala Arg Leu Arg Ala Lys His Tyr Val Tyr Ile Gly				
1310		1315		1320
Asp Pro Ala Gln Leu Pro Ala Pro Arg Thr Leu Leu Thr Lys Gly				
1325		1330		1335
Thr Leu Glu Pro Glu Tyr Phe Asn Ser Val Cys Arg Leu Met Lys				
1340		1345		1350
Thr Ile Gly Pro Asp Met Phe Leu Gly Thr Cys Arg Arg Cys Pro				
1355		1360		1365
Ala Glu Ile Val Asp Thr Val Ser Ala Leu Val Tyr Asp Asn Lys				
1370		1375		1380
Leu Lys Ala His Lys Asp Lys Ser Ala Gln Cys Phe Lys Met Phe				
1385		1390		1395
Tyr Lys Gly Val Ile Thr His Asp Val Ser Ser Ala Ile Asn Arg				
1400		1405		1410
Pro Gln Ile Gly Val Val Arg Glu Phe Leu Thr Arg Asn Pro Ala				
1415		1420		1425
Trp Arg Lys Ala Val Phe Ile Ser Pro Tyr Asn Ser Gln Asn Ala				
1430		1435		1440
Val Ala Ser Lys Ile Leu Gly Leu Pro Thr Gln Thr Val Asp Ser				
1445		1450		1455
Ser Gln Gly Ser Glu Tyr Asp Tyr Val Ile Phe Thr Gln Thr Thr				
1460		1465		1470
Glu Thr Ala His Ser Cys Asn Val Asn Arg Phe Asn Val Ala Ile				
1475		1480		1485
Thr Arg Ala Lys Ile Gly Ile Leu Cys Ile Met Ser Asp Arg Asp				
1490		1495		1500

Leu Tyr	Asp Lys	Leu Gln	Phe	Thr Ser	Leu Glu	Ile	Pro Arg	Arg	
1505			1510			1515			
Asn Val	Ala Thr	Leu Gln	Ala	Glu Asn	Val Thr	Gly	Leu Phe	Lys	
1520			1525			1530			
Asp Cys	Ser Lys	Ile Ile	Thr	Gly Leu	His Pro	Thr	Gln Ala	Pro	
1535			1540			1545			
Thr His	Leu Ser	Val Asp	Ile	Lys Phe	Lys Thr	Glu	Gly Leu	Cys	
1550			1555			1560			
Val Asp	Ile Pro	Gly Ile	Pro	Lys Asp	Met Thr	Tyr	Arg Arg	Leu	
1565			1570			1575			
Ile Ser	Met Met	Gly Phe	Lys	Met Asn	Tyr Gln	Val	Asn Gly	Tyr	
1580			1585			1590			
Pro Asn	Met Phe	Ile Thr	Arg	Glu Glu	Ala Ile	Arg	His Val	Arg	
1595			1600			1605			
Ala Trp	Ile Gly	Phe Asp	Val	Glu Gly	Cys His	Ala	Thr Arg	Asp	
1610			1615			1620			
Ala Val	Gly Thr	Asn Leu	Pro	Leu Gln	Leu Gly	Phe	Ser Thr	Gly	
1625			1630			1635			
Val Asn	Leu Val	Ala Val	Pro	Thr Gly	Tyr Val	Asp	Thr Glu	Asn	
1640			1645			1650			
Asn Thr	Glu Phe	Thr Arg	Val	Asn Ala	Lys Pro	Pro	Pro Gly	Asp	
1655			1660			1665			
Gln Phe	Lys His	Leu Ile	Pro	Leu Met	Tyr Lys	Gly	Leu Pro	Trp	
1670			1675			1680			
Asn Val	Val Arg	Ile Lys	Ile	Val Gln	Met Leu	Ser	Asp Thr	Leu	
1685			1690			1695			
Lys Gly	Leu Ser	Asp Arg	Val	Val Phe	Val Leu	Trp	Ala His	Gly	
1700			1705			1710			

Phe	Glu	Leu	Thr	Ser	Met	Lys	Tyr	Phe	Val	Lys	Ile	Gly	Pro	Glu
1715						1720					1725			
Arg	Thr	Cys	Cys	Leu	Cys	Asp	Lys	Arg	Ala	Thr	Cys	Phe	Ser	Thr
1730						1735					1740			
Ser	Ser	Asp	Thr	Tyr	Ala	Cys	Trp	Asn	His	Ser	Val	Gly	Phe	Asp
1745						1750					1755			
Tyr	Val	Tyr	Asn	Pro	Phe	Met	Ile	Asp	Val	Gln	Gln	Trp	Gly	Phe
1760						1765					1770			
Thr	Gly	Asn	Leu	Gln	Ser	Asn	His	Asp	Gln	His	Cys	Gln	Val	His
1775						1780					1785			
Gly	Asn	Ala	His	Val	Ala	Ser	Cys	Asp	Ala	Ile	Met	Thr	Arg	Cys
1790						1795					1800			
Leu	Ala	Val	His	Glu	Cys	Phe	Val	Lys	Arg	Val	Asp	Trp	Ser	Val
1805						1810					1815			
Glu	Tyr	Pro	Ile	Ile	Gly	Asp	Glu	Leu	Arg	Val	Asn	Ser	Ala	Cys
1820						1825					1830			
Arg	Lys	Val	Gln	His	Met	Val	Val	Lys	Ser	Ala	Leu	Leu	Ala	Asp
1835						1840					1845			
Lys	Phe	Pro	Val	Leu	His	Asp	Ile	Gly	Asn	Pro	Lys	Ala	Ile	Lys
1850						1855					1860			
Cys	Val	Pro	Gln	Ala	Glu	Val	Glu	Trp	Lys	Phe	Tyr	Asp	Ala	Gln
1865						1870					1875			
Pro	Cys	Ser	Asp	Lys	Ala	Tyr	Lys	Ile	Glu	Glu	Leu	Phe	Tyr	Ser
1880						1885					1890			
Tyr	Ala	Thr	His	His	Asp	Lys	Phe	Thr	Asp	Gly	Val	Cys	Leu	Phe
1895						1900					1905			
Trp	Asn	Cys	Asn	Val	Asp	Arg	Tyr	Pro	Ala	Asn	Ala	Ile	Val	Cys
1910						1915					1920			

2135		2140		2145
Thr Ile Gly Val Cys Thr Met	Thr Asp Ile Ala Lys	Lys Pro Thr		
2150	2155	2160		
Glu Ser Ala Cys Ser Ser Leu	Thr Val Leu Phe Asp	Gly Arg Val		
2165	2170	2175		
Glu Gly Gln Val Asp Leu Phe	Arg Asn Ala Arg Asn	Gly Val Leu		
2180	2185	2190		
Ile Thr Glu Gly Ser Val Lys	Gly Leu Thr Pro Ser	Lys Gly Pro		
2195	2200	2205		
Ala Gln Ala Ser Val Asn Gly	Val Thr Leu Ile Gly	Glu Ser Val		
2210	2215	2220		
Lys Thr Gln Phe Asn Tyr Phe	Lys Lys Val Asp Gly	Ile Ile Gln		
2225	2230	2235		
Gln Leu Pro Glu Thr Tyr Phe	Thr Gln Ser Arg Asp	Leu Glu Asp		
2240	2245	2250		
Phe Lys Pro Arg Ser Gln Met	Glu Thr Asp Phe Leu	Glu Leu Ala		
2255	2260	2265		
Met Asp Glu Phe Ile Gln Arg	Tyr Lys Leu Glu Gly	Tyr Ala Phe		
2270	2275	2280		
Glu His Ile Val Tyr Gly Asp	Phe Ser His Gly Gln	Leu Gly Gly		
2285	2290	2295		
Leu His Leu Met Ile Gly Leu	Ala Lys Arg Ser Gln	Asp Ser Pro		
2300	2305	2310		
Leu Lys Leu Glu Asp Phe Ile	Pro Met Asp Ser Thr	Val Lys Asn		
2315	2320	2325		
Tyr Phe Ile Thr Asp Ala Gln	Thr Gly Ser Ser Lys	Cys Val Cys		
2330	2335	2340		
Ser Val Ile Asp Leu Leu Leu	Asp Asp Phe Val Glu	Ile Ile Lys		
2345	2350	2355		

Ser Gln	Asp Leu	Ser Val	Ile	Ser Lys	Val Val	Lys	Val Thr	Ile	
2360			2365			2370			
Asp Tyr	Ala Glu	Ile Ser	Phe	Met Leu	Trp Cys	Lys	Asp Gly	His	
2375			2380			2385			
Val Glu	Thr Phe	Tyr Pro	Lys	Leu Gln	Ala Ser	Gln	Ala Trp	Gln	
2390			2395			2400			
Pro Gly	Val Ala	Met Pro	Asn	Leu Tyr	Lys Met	Gln	Arg Met	Leu	
2405			2410			2415			
Leu Glu	Lys Cys	Asp Leu	Gln	Asn Tyr	Gly Glu	Asn	Ala Val	Ile	
2420			2425			2430			
Pro Lys	Gly Ile	Met Met	Asn	Val Ala	Lys Tyr	Thr	Gln Leu	Cys	
2435			2440			2445			
Gln Tyr	Leu Asn	Thr Leu	Thr	Leu Ala	Val Pro	Tyr	Asn Met	Arg	
2450			2455			2460			
Val Ile	His Phe	Gly Ala	Gly	Ser Asp	Lys Gly	Val	Ala Pro	Gly	
2465			2470			2475			
Thr Ala	Val Leu	Arg Gln	Trp	Leu Pro	Thr Gly	Thr	Leu Leu	Val	
2480			2485			2490			
Asp Ser	Asp Leu	Asn Asp	Phe	Val Ser	Asp Ala	Asp	Ser Thr	Leu	
2495			2500			2505			
Ile Gly	Asp Cys	Ala Thr	Val	His Thr	Ala Asn	Lys	Trp Asp	Leu	
2510			2515			2520			
Ile Ile	Ser Asp	Met Tyr	Asp	Pro Arg	Thr Lys	His	Val Thr	Lys	
2525			2530			2535			
Glu Asn	Asp Ser	Lys Glu	Gly	Phe Phe	Thr Tyr	Leu	Cys Gly	Phe	
2540			2545			2550			
Ile Lys	Gln Lys	Leu Ala	Leu	Gly Gly	Ser Ile	Ala	Val Lys	Ile	
2555			2560			2565			

Thr Glu His Ser Trp Asn Ala Asp Leu Tyr Lys Leu Met Gly His
 2570 2575 2580

Phe Ser Trp Trp Thr Ala Phe Val Thr Asn Val Asn Ala Ser Ser
 2585 2590 2595

Ser Glu Ala Phe Leu Ile Gly Ala Asn Tyr Leu Gly Lys Pro Lys
 2600 2605 2610

Glu Gln Ile Asp Gly Tyr Thr Met His Ala Asn Tyr Ile Phe Trp
 2615 2620 2625

Arg Asn Thr Asn Pro Ile Gln Leu Ser Ser Tyr Ser Leu Phe Asp
 2630 2635 2640

Met Ser Lys Phe Pro Leu Lys Leu Arg Gly Thr Ala Val Met Ser
 2645 2650 2655

Leu Lys Glu Asn Gln Ile Asn Asp Met Ile Tyr Ser Leu Leu Glu
 2660 2665 2670

Lys Gly Arg Leu Ile Ile Arg Glu Asn Asn Arg Val Val Val Ser
 2675 2680 2685

Ser Asp Ile Leu Val Asn Asn
 2690 2695

<210> 4
 <211> 1255
 <212> PRT
 <213> Coronavirus

<400> 4

Met Phe Ile Phe Leu Leu Phe Leu Thr Leu Thr Ser Gly Ser Asp Leu
 1 5 10 15

Asp Arg Cys Thr Thr Phe Asp Asp Val Gln Ala Pro Asn Tyr Thr Gln
 20 25 30

His Thr Ser Ser Met Arg Gly Val Tyr Tyr Pro Asp Glu Ile Phe Arg
 35 40 45

Ser Asp Thr Leu Tyr Leu Thr Gln Asp Leu Phe Leu Pro Phe Tyr Ser
 50 55 60

Asn Val Thr Gly Phe His Thr Ile Asn His Thr Phe Gly Asn Pro Val
65 70 75 80

Ile Pro Phe Lys Asp Gly Ile Tyr Phe Ala Ala Thr Glu Lys Ser Asn
85 90 95

Val Val Arg Gly Trp Val Phe Gly Ser Thr Met Asn Asn Lys Ser Gln
100 105 110

Ser Val Ile Ile Ile Asn Asn Ser Thr Asn Val Val Ile Arg Ala Cys
115 120 125

Asn Phe Glu Leu Cys Asp Asn Pro Phe Phe Ala Val Ser Lys Pro Met
130 135 140

Gly Thr Gln Thr His Thr Met Ile Phe Asp Asn Ala Phe Asn Cys Thr
145 150 155 160

Phe Glu Tyr Ile Ser Asp Ala Phe Ser Leu Asp Val Ser Glu Lys Ser
165 170 175

Gly Asn Phe Lys His Leu Arg Glu Phe Val Phe Lys Asn Lys Asp Gly
180 185 190

Phe Leu Tyr Val Tyr Lys Gly Tyr Gln Pro Ile Asp Val Val Arg Asp
195 200 205

Leu Pro Ser Gly Phe Asn Thr Leu Lys Pro Ile Phe Lys Leu Pro Leu
210 215 220

Gly Ile Asn Ile Thr Asn Phe Arg Ala Ile Leu Thr Ala Phe Ser Pro
225 230 235 240

Ala Gln Asp Ile Trp Gly Thr Ser Ala Ala Ala Tyr Phe Val Gly Tyr
245 250 255

Leu Lys Pro Thr Thr Phe Met Leu Lys Tyr Asp Glu Asn Gly Thr Ile
260 265 270

Thr Asp Ala Val Asp Cys Ser Gln Asn Pro Leu Ala Glu Leu Lys Cys
275 280 285

Ser Val Lys Ser Phe Glu Ile Asp Lys Gly Ile Tyr Gln Thr Ser Asn
 290 295 300

Phe Arg Val Val Pro Ser Gly Asp Val Val Arg Phe Pro Asn Ile Thr
 305 310 315 320

Asn Leu Cys Pro Phe Gly Glu Val Phe Asn Ala Thr Lys Phe Pro Ser
 325 330 335

Val Tyr Ala Trp Glu Arg Lys Lys Ile Ser Asn Cys Val Ala Asp Tyr
 340 345 350

Ser Val Leu Tyr Asn Ser Thr Phe Phe Ser Thr Phe Lys Cys Tyr Gly
 355 360 365

Val Ser Ala Thr Lys Leu Asn Asp Leu Cys Phe Ser Asn Val Tyr Ala
 370 375 380

Asp Ser Phe Val Val Lys Gly Asp Asp Val Arg Gln Ile Ala Pro Gly
 385 390 395 400

Gln Thr Gly Val Ile Ala Asp Tyr Asn Tyr Lys Leu Pro Asp Asp Phe
 405 410 415

Met Gly Cys Val Leu Ala Trp Asn Thr Arg Asn Ile Asp Ala Thr Ser
 420 425 430

Thr Gly Asn Tyr Asn Tyr Lys Tyr Arg Tyr Leu Arg His Gly Lys Leu
 435 440 445

Arg Pro Phe Glu Arg Asp Ile Ser Asn Val Pro Phe Ser Pro Asp Gly
 450 455 460

Lys Pro Cys Thr Pro Pro Ala Leu Asn Cys Tyr Trp Pro Leu Asn Asp
 465 470 475 480

Tyr Gly Phe Tyr Thr Thr Thr Gly Ile Gly Tyr Gln Pro Tyr Arg Val
 485 490 495

Val Val Leu Ser Phe Glu Leu Leu Asn Ala Pro Ala Thr Val Cys Gly
 500 505 510

Pro Lys Leu Ser Thr Asp Leu Ile Lys Asn Gln Cys Val Asn Phe Asn
515 520 525

Phe Asn Gly Leu Thr Gly Thr Gly Val Leu Thr Pro Ser Ser Lys Arg
530 535 540

Phe Gln Pro Phe Gln Gln Phe Gly Arg Asp Val Ser Asp Phe Thr Asp
545 550 555 560

Ser Val Arg Asp Pro Lys Thr Ser Glu Ile Leu Asp Ile Ser Pro Cys
565 570 575

Ser Phe Gly Gly Val Ser Val Ile Thr Pro Gly Thr Asn Ala Ser Ser
580 585 590

Glu Val Ala Val Leu Tyr Gln Asp Val Asn Cys Thr Asp Val Ser Thr
595 600 605

Ala Ile His Ala Asp Gln Leu Thr Pro Ala Trp Arg Ile Tyr Ser Thr
610 615 620

Gly Asn Asn Val Phe Gln Thr Gln Ala Gly Cys Leu Ile Gly Ala Glu
625 630 635 640

His Val Asp Thr Ser Tyr Glu Cys Asp Ile Pro Ile Gly Ala Gly Ile
645 650 655

Cys Ala Ser Tyr His Thr Val Ser Leu Leu Arg Ser Thr Ser Gln Lys
660 665 670

Ser Ile Val Ala Tyr Thr Met Ser Leu Gly Ala Asp Ser Ser Ile Ala
675 680 685

Tyr Ser Asn Asn Thr Ile Ala Ile Pro Thr Asn Phe Ser Ile Ser Ile
690 695 700

Thr Thr Glu Val Met Pro Val Ser Met Ala Lys Thr Ser Val Asp Cys
705 710 715 720

Asn Met Tyr Ile Cys Gly Asp Ser Thr Glu Cys Ala Asn Leu Leu Leu
725 730 735

Gln Tyr Gly Ser Phe Cys Thr Gln Leu Asn Arg Ala Leu Ser Gly Ile

740					745					750						
Ala	Ala	Glu	Gln	Asp	Arg	Asn	Thr	Arg	Glu	Val	Phe	Ala	Gln	Val	Lys	
755					760					765						
Gln	Met	Tyr	Lys	Thr	Pro	Thr	Leu	Lys	Tyr	Phe	Gly	Gly	Phe	Asn	Phe	
770					775					780						
Ser	Gln	Ile	Leu	Pro	Asp	Pro	Leu	Lys	Pro	Thr	Lys	Arg	Ser	Phe	Ile	
785					790					795					800	
Glu	Asp	Leu	Leu	Phe	Asn	Lys	Val	Thr	Leu	Ala	Asp	Ala	Gly	Phe	Met	
805					810					815						
Lys	Gln	Tyr	Gly	Glu	Cys	Leu	Gly	Asp	Ile	Asn	Ala	Arg	Asp	Leu	Ile	
820					825					830						
Cys	Ala	Gln	Lys	Phe	Asn	Gly	Leu	Thr	Val	Leu	Pro	Pro	Leu	Leu	Thr	
835					840					845						
Asp	Asp	Met	Ile	Ala	Ala	Tyr	Thr	Ala	Ala	Leu	Val	Ser	Gly	Thr	Ala	
850					855					860						
Thr	Ala	Gly	Trp	Thr	Phe	Gly	Ala	Gly	Ala	Ala	Leu	Gln	Ile	Pro	Phe	
865					870					875					880	
Ala	Met	Gln	Met	Ala	Tyr	Arg	Phe	Asn	Gly	Ile	Gly	Val	Thr	Gln	Asn	
885					890					895						
Val	Leu	Tyr	Glu	Asn	Gln	Lys	Gln	Ile	Ala	Asn	Gln	Phe	Asn	Lys	Ala	
900					905					910						
Ile	Ser	Gln	Ile	Gln	Glu	Ser	Leu	Thr	Thr	Thr	Ser	Thr	Ala	Leu	Gly	
915					920					925						
Lys	Leu	Gln	Asp	Val	Val	Asn	Gln	Asn	Ala	Gln	Ala	Leu	Asn	Thr	Leu	
930					935					940						
Val	Lys	Gln	Leu	Ser	Ser	Asn	Phe	Gly	Ala	Ile	Ser	Ser	Val	Leu	Asn	
945					950					955					960	
Asp	Ile	Leu	Ser	Arg	Leu	Asp	Lys	Val	Glu	Ala	Glu	Val	Gln	Ile	Asp	
965					970					975						

Glu Gln Tyr Ile Lys Trp Pro Trp Tyr Val Trp Leu Gly Phe Ile
 1190 1195 1200

Ala Gly Leu Ile Ala Ile Val Met Val Thr Ile Leu Leu Cys Cys
 1205 1210 1215

Met Thr Ser Cys Cys Ser Cys Leu Lys Gly Ala Cys Ser Cys Gly
 1220 1225 1230

Ser Cys Cys Lys Phe Asp Glu Asp Asp Ser Glu Pro Val Leu Lys
 1235 1240 1245

Gly Val Lys Leu His Tyr Thr
 1250 1255

<210> 5
 <211> 274
 <212> PRT
 <213> Coronavirus

<400> 5

Met Asp Leu Phe Met Arg Phe Phe Thr Leu Gly Ser Ile Thr Ala Gln
 1 5 10 15

Pro Val Lys Ile Asp Asn Ala Ser Pro Ala Ser Thr Val His Ala Thr
 20 25 30

Ala Thr Ile Pro Leu Gln Ala Ser Leu Pro Phe Gly Trp Leu Val Ile
 35 40 45

Gly Val Ala Phe Leu Ala Val Phe Gln Ser Ala Thr Lys Ile Ile Ala
 50 55 60

Leu Asn Lys Arg Trp Gln Leu Ala Leu Tyr Lys Gly Phe Gln Phe Ile
 65 70 75 80

Cys Asn Leu Leu Leu Leu Phe Val Thr Ile Tyr Ser His Leu Leu Leu
 85 90 95

Val Ala Ala Gly Met Glu Ala Gln Phe Leu Tyr Leu Tyr Ala Leu Ile
 100 105 110

Tyr Phe Leu Gln Cys Ile Asn Ala Cys Arg Ile Ile Met Arg Cys Trp

115	120	125
Leu Cys Trp Lys Cys Lys Ser Lys Asn Pro Leu Leu Tyr Asp Ala Asn		
130	135	140
Tyr Phe Val Cys Trp His Thr His Asn Tyr Asp Tyr Cys Ile Pro Tyr		
145	150	155
Asn Ser Val Thr Asp Thr Ile Val Val Thr Glu Gly Asp Gly Ile Ser		
	165	170
Thr Pro Lys Leu Lys Glu Asp Tyr Gln Ile Gly Gly Tyr Ser Glu Asp		
	180	185
Arg His Ser Gly Val Lys Asp Tyr Val Val Val His Gly Tyr Phe Thr		
	195	200
Glu Val Tyr Tyr Gln Leu Glu Ser Thr Gln Ile Thr Thr Asp Thr Gly		
	210	215
Ile Glu Asn Ala Thr Phe Phe Ile Phe Asn Lys Leu Val Lys Asp Pro		
225	230	235
Pro Asn Val Gln Ile His Thr Ile Asp Gly Ser Ser Gly Val Ala Asn		
	245	250
Pro Ala Met Asp Pro Ile Tyr Asp Glu Pro Thr Thr Thr Thr Ser Val		
	260	265
		270

Pro Leu

<210> 6
 <211> 154
 <212> PRT
 <213> Coronavirus

<400> 6

Met Met Pro Thr Thr Leu Phe Ala Gly Thr His Ile Thr Met Thr Thr
1 5 10 15
Val Tyr His Ile Thr Val Ser Gln Ile Gln Leu Ser Leu Leu Lys Val
20 25 30

Thr Ala Phe Gln His Gln Asn Ser Lys Lys Thr Thr Lys Leu Val Val
35 40 45

Ile Leu Arg Ile Gly Thr Gln Val Leu Lys Thr Met Ser Leu Tyr Met
50 55 60

Ala Ile Ser Pro Lys Phe Thr Thr Ser Leu Ser Leu His Lys Leu Leu
65 70 75 80

Gln Thr Leu Val Leu Lys Met Leu His Ser Ser Ser Leu Thr Ser Leu
85 90 95

Leu Lys Thr His Arg Met Cys Lys Tyr Thr Gln Ser Thr Ala Leu Gln
100 105 110

Glu Leu Leu Ile Gln Gln Trp Ile Gln Phe Met Met Ser Arg Arg Arg
115 120 125

Leu Leu Ala Cys Leu Cys Lys His Lys Lys Val Ser Thr Asn Leu Cys
130 135 140

Thr His Ser Phe Arg Lys Lys Gln Val Arg
145 150

<210> 7
<211> 76
<212> PRT
<213> Coronavirus

<400> 7

Met Tyr Ser Phe Val Ser Glu Glu Thr Gly Thr Leu Ile Val Asn Ser
1 5 10 15

Val Leu Leu Phe Leu Ala Phe Val Val Phe Leu Leu Val Thr Leu Ala
20 25 30

Ile Leu Thr Ala Leu Arg Leu Cys Ala Tyr Cys Cys Asn Ile Val Asn
35 40 45

Val Ser Leu Val Lys Pro Thr Val Tyr Val Tyr Ser Arg Val Lys Asn
50 55 60

Leu Asn Ser Ser Glu Gly Val Pro Asp Leu Leu Val

65

70

75

<210> 8
 <211> 221
 <212> PRT
 <213> Coronavirus

<400> 8

Met Ala Asp Asn Gly Thr Ile Thr Val Glu Glu Leu Lys Gln Leu Leu
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Glu Gln Trp Asn Leu Val Ile Gly Phe Leu Phe Leu Ala Trp Ile Met
 20 25 30

Leu Leu Gln Phe Ala Tyr Ser Asn Arg Asn Arg Phe Leu Tyr Ile Ile
 35 40 45

Lys Leu Val Phe Leu Trp Leu Leu Trp Pro Val Thr Leu Ala Cys Phe
 50 55 60

Val Leu Ala Ala Val Tyr Arg Ile Asn Trp Val Thr Gly Gly Ile Ala
 65 70 75 80

Ile Ala Met Ala Cys Ile Val Gly Leu Met Trp Leu Ser Tyr Phe Val
 85 90 95

Ala Ser Phe Arg Leu Phe Ala Arg Thr Arg Ser Met Trp Ser Phe Asn
 100 105 110

Pro Glu Thr Asn Ile Leu Leu Asn Val Pro Leu Arg Gly Thr Ile Val
 115 120 125

Thr Arg Pro Leu Met Glu Ser Glu Leu Val Ile Gly Ala Val Ile Ile
 130 135 140

Arg Gly His Leu Arg Met Ala Gly His Pro Leu Gly Arg Cys Asp Ile
 145 150 155 160

Lys Asp Leu Pro Lys Glu Ile Thr Val Ala Thr Ser Arg Thr Leu Ser
 165 170 175

Tyr Tyr Lys Leu Gly Ala Ser Gln Arg Val Gly Thr Asp Ser Gly Phe
 180 185 190

Ala Ala Tyr Asn Arg Tyr Arg Ile Gly Asn Tyr Lys Leu Asn Thr Asp
 195 200 205

His Ala Gly Ser Asn Asp Asn Ile Ala Leu Leu Val Gln
 210 215 220

<210> 9
 <211> 63
 <212> PRT
 <213> Coronavirus

<400> 9

Met Phe His Leu Val Asp Phe Gln Val Thr Ile Ala Glu Ile Leu Ile
 1 5 10 15

Ile Ile Met Arg Thr Phe Arg Ile Ala Ile Trp Asn Leu Asp Val Ile
 20 25 30

Ile Ser Ser Ile Val Arg Gln Leu Phe Lys Pro Leu Thr Lys Lys Asn
 35 40 45

Tyr Ser Glu Leu Asp Asp Glu Glu Pro Met Glu Leu Asp Tyr Pro
 50 55 60

<210> 10
 <211> 122
 <212> PRT
 <213> Coronavirus

<400> 10

Met Lys Ile Ile Leu Phe Leu Thr Leu Ile Val Phe Thr Ser Cys Glu
 1 5 10 15

Leu Tyr His Tyr Gln Glu Cys Val Arg Gly Thr Thr Val Leu Leu Lys
 20 25 30

Glu Pro Cys Pro Ser Gly Thr Tyr Glu Gly Asn Ser Pro Phe His Pro
 35 40 45

Leu Ala Asp Asn Lys Phe Ala Leu Thr Cys Thr Ser Thr His Phe Ala
 50 55 60

Phe Ala Cys Ala Asp Gly Thr Arg His Thr Tyr Gln Leu Arg Ala Arg
 65 70 75 80

Ser Val Ser Pro Lys Leu Phe Ile Arg Gln Glu Glu Val Gln Gln Glu
85 90 95

Leu Tyr Ser Pro Leu Phe Leu Ile Val Ala Ala Leu Val Phe Leu Ile
100 105 110

Leu Cys Phe Thr Ile Lys Arg Lys Thr Glu
115 120

<210> 11
<211> 84
<212> PRT
<213> Coronavirus

<400> 11

Met Cys Leu Lys Ile Leu Val Arg Tyr Asn Thr Arg Gly Asn Thr Tyr
1 5 10 15

Ser Thr Ala Trp Leu Cys Ala Leu Gly Lys Val Leu Pro Phe His Arg
20 25 30

Trp His Thr Met Val Gln Thr Cys Thr Pro Asn Val Thr Ile Asn Cys
35 40 45

Gln Asp Pro Ala Gly Gly Ala Leu Ile Ala Arg Cys Trp Tyr Leu His
50 55 60

Glu Gly His Gln Thr Ala Ala Phe Arg Asp Val Leu Val Val Leu Asn
65 70 75 80

Lys Arg Thr Asn

<210> 12
<211> 422
<212> PRT
<213> Coronavirus

<400> 12

Met Ser Asp Asn Gly Pro Gln Ser Asn Gln Arg Ser Ala Pro Arg Ile
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Thr Phe Gly Gly Pro Thr Asp Ser Thr Asp Asn Asn Gln Asn Gly Gly
20 25 30

Arg Asn Gly Ala Arg Pro Lys Gln Arg Arg Pro Gln Gly Leu Pro Asn
35 40 45

Asn Thr Ala Ser Trp Phe Thr Ala Leu Thr Gln His Gly Lys Glu Glu
50 55 60

Leu Arg Phe Pro Arg Gly Gln Gly Val Pro Ile Asn Thr Asn Ser Gly
65 70 75 80

Pro Asp Asp Gln Ile Gly Tyr Tyr Arg Arg Ala Thr Arg Arg Val Arg
85 90 95

Gly Gly Asp Gly Lys Met Lys Glu Leu Ser Pro Arg Trp Tyr Phe Tyr
100 105 110

Tyr Leu Gly Thr Gly Pro Glu Ala Ser Leu Pro Tyr Gly Ala Asn Lys
115 120 125

Glu Gly Ile Val Trp Val Ala Thr Glu Gly Ala Leu Asn Thr Pro Lys
130 135 140

Asp His Ile Gly Thr Arg Asn Pro Asn Asn Ala Ala Thr Val Leu
145 150 155 160

Gln Leu Pro Gln Gly Thr Thr Leu Pro Lys Gly Phe Tyr Ala Glu Gly
165 170 175

Ser Arg Gly Gly Ser Gln Ala Ser Ser Arg Ser Ser Ser Arg Ser Arg
180 185 190

Gly Asn Ser Arg Asn Ser Thr Pro Gly Ser Ser Arg Gly Asn Ser Pro
195 200 205

Ala Arg Met Ala Ser Gly Gly Gly Glu Thr Ala Leu Ala Leu Leu Leu
210 215 220

Leu Asp Arg Leu Asn Gln Leu Glu Ser Lys Val Ser Gly Lys Gly Gln
225 230 235 240

Gln Gln Gln Gly Gln Thr Val Thr Lys Lys Ser Ala Ala Glu Ala Ser
245 250 255

Lys Lys Pro Arg Gln Lys Arg Thr Ala Thr Lys Gln Tyr Asn Val Thr

260	265	270
Gln Ala Phe Gly Arg Arg Gly	Pro Glu Gln Thr Gln Gly	Asn Phe Gly
275	280	285
Asp Gln Asp Leu Ile Arg Gln Gly	Thr Asp Tyr Lys His Trp Pro Gln	
290	295	300
Ile Ala Gln Phe Ala Pro Ser Ala Ser	Ala Phe Phe Gly Met Ser Arg	
305	310	315
Ile Gly Met Glu Val Thr Pro Ser Gly	Thr Trp Leu Thr Tyr His Gly	
325	330	335
Ala Ile Lys Leu Asp Asp Lys Asp	Pro Gln Phe Lys Asp Asn Val Ile	
340	345	350
Leu Leu Asn Lys His Ile Asp Ala Tyr	Lys Thr Phe Pro Pro Thr Glu	
355	360	365
Pro Lys Lys Asp Lys Lys Lys Lys	Thr Asp Glu Ala Gln Pro Leu Pro	
370	375	380
Gln Arg Gln Lys Lys Gln Pro Thr Val	Thr Leu Leu Pro Ala Ala Asp	
385	390	395
Met Asp Asp Phe Ser Arg Gln Leu Gln	Asn Ser Met Ser Gly Ala Ser	
405	410	415
Ala Asp Ser Thr Gln Ala		
420		

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 <213> Artificial Sequence

<220>
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<400> 13
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21

<210> 14
 <211> 21

<212> DNA
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 <220>
 <223> Synthetic oligonucleotide.

 <400> 14
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<210> 15
 <211> 21
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 <220>
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 <400> 15
 caggtaagcg taaaactcat c 21

<210> 16
 <211> 22
 <212> DNA
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 <220>
 <223> Synthetic oligonucleotide.

 <400> 16
 catgtgtggc ggctcactat at 22

<210> 17
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 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Synthetic oligonucleotide.

 <400> 17
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<210> 18
 <211> 27
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 <220>
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 <400> 18
 ttaaaccagg tggaacatca tccggtg 27

<210> 19
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 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Synthetic oligonucleotide.

 <400> 19
 ggagccttga atacacccaa ag 22

 <210> 20
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 <212> DNA
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 <400> 20
 gcacggtggc agcattg 17

 <210> 21
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 <400> 21
 ccacattggc acccgcaatc c 21

 <210> 22
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 <400> 22
 caaacattgg ccgcaaatt 19

 <210> 23
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 <400> 23

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<210> 24

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<213> Artificial Sequence

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<223> Synthetic oligonucleotide.

<400> 24

cacaatttgc tccaagtgcc tctgca 26

<210> 25

<211> 21

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<213> Artificial Sequence

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<400> 25

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<210> 26

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<400> 26

ccgaagagct acccgacg 18

<210> 27

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<400> 27

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<210> 28

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<213> Artificial Sequence

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<400> 28
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<210> 29
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<400> 29
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<210> 30
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<212> DNA
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<223> Synthetic oligonucleotide.

<400> 30
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<210> 31
<211> 23
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tgtaggcact gattcaggtt ttg 23

<210> 32
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<210> 33
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 ctgcatacaa cgcctaccgt attggaa 27
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 <400> 36
 agatttggac ctgcgagcg 19
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<400> 37

gagcggctgt ctccacaagt

20

<210> 38

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<400> 38

ttctgacctg aaggctctgc gcg

23